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# साइकिल रिम की टेपें व बक्कल — विशिष्टि

( दूसरा पुनरीक्षण )

*Indian Standard*

# BICYCLE RIM TAPES AND BUCKLES — SPECIFICATION

*( Second Revision )*

ICS 43.150

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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**Price Group 4**

Bicycles Sectional Committee, TED 16

FOREWORD

This Indian Standard ( Second Revision ) was adopted by the Bureau of Indian Standards, after the draft finalized by the Bicycles Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first issued in 1958 and subsequently revised in 1969 and the present revision is being taken up to include rubber compound and plastic tapes.

This standard is one of the series of Indian Standards on bicycles, their parts and accessories.

The composition of the Committee responsible for the formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( *revised* )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# *Indian Standard*

# BICYCLE RIM TAPES AND BUCKLES — SPECIFICATION

## *( Second Revision )*

## 1 SCOPE

**1.1** This standard covers the requirements for cotton, rubber and plastic rim tapes and buckles.

**1.2** This standard does not specify the general appearance, feel, etc, of the tapes.

## 2 REFERENCES

The following standards contain provisions, which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

| *IS No.* | *Title* |
|---|---|
| 196 : 1966 | Atmospheric conditions for testing ( *revised* ) |
| 1068 : 1993 | Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium ( *third revision* ) |
| 1359 : 1992 | Electroplated coatings of tin — Specification ( *third revision* ) |
| 1573 : 1986 | Specification for electroplated coatings of zinc on iron and steel ( *second revision* ) |
| 1954 : 1990 | Determination of length and width of woven fabrics — Methods ( *second revision* ) |
| 1963 : 1981 | Methods for determination of threads per unit length in woven fabrics ( *second revision* ) |
| 1969 : 1985 | Methods for determination of breaking strength and elongation of woven textile fabrics ( *second revision* ) |
| 2415 : 2004 | Cycles — Rubber tubes — Specification ( *third revision* ) |
| 2500 ( Part 1 ) : 2000/ ISO 2859-1 : 1999 | Sampling procedures for inspection by attributes: Part 1 Sampling schemes indexed by acceptable quality level ( AQL ) for lot-by-lot inspection ( *third revision* ) |

## 3 MATERIALS

### 3.1 Tapes

The tapes shall be made from cotton, rubber compound and plastic.

### 3.2 Buckles

The buckles shall be made of suitable black plate for tinning.

## 4 REQUIREMENTS FOR COTTON TAPES

**4.1** Un-sized cotton yarn of 2 ply shall be used in the manufacture of the tapes. It shall be reasonably clean and free from spinning defects and shall be of a quality required to ensure that the tapes comply with the requirements of this standard. The plied yarn shall be uniformly twisted.

**4.2** The tapes shall be free from sizing and finishing materials or other added fillings.

**4.3** The cotton tapes shall comply with the requirements of Table 1.

## 5 REQUIREMENTS FOR RUBBER RIM TAPES

Rubber compound shall be used in the manufacture of the tapes. These tapes shall comply with the requirements given in Table 2.

## 6 REQUIREMENTS FOR PLASTIC RIM TAPES

Plastic tapes shall comply with requirements given in Table 3.

## 7 LENGTH REQUIREMENTS FOR RUBBER AND PLASTIC TAPES FOR DIFFERENT SIZES OF RIMS

**7.1** The length requirements for rubber and plastic tapes for rims shall be as given in Table 4.

### 7.2 Method of Test

*See* **A-2**.

## 8 WIDTH REQUIREMENTS IN RUBBER AND PLASTIC TAPES FOR DIFFERENT SIZES OF RIMS

**8.1** *See* Table 5.

### 8.2 Method of Test

*See* **A-3**.

## Table 1 Requirements for Cotton Rim Tapes

( *Clause* 4.3 )

| Sl No. | Characteristic | Requirement | Method of Test, Ref to |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Universal count in tex ( or cotton count ) of warp and weft yarn, approx | 60 tex × 2 ( or 10 s/2 ) | — |
| ii) | Weave | 2/2 V-twill | — |
| iii) | Width, mm | 13.5 ± 0.4 | Annex A |
| iv) | Ends in full width | 22 | 7.1 of IS 1963 |
| v) | Picks per dm | 70 to 80 | 7.2 of IS 1963 |
| vi) | Thickness, mm: | | |
| | *Max* | 1.07 | 8.2 to 8.5 of IS 1954 |
| | *Min* | 0.97 | (*see also* Note) |
| vii) | Weight per 100 m, g; *Min* | 550 | Annex B |
| viii) | Breaking load on full width × 20 cm strips, kgf | 32.0 | 9.1 to 9.4 of IS 1969 |
| ix) | Maximum elongation, percent, at a load of 22.5 kgf | 9.5 | 9.1 to 9.4 of IS 1969 |

NOTE — The thickness of tape shall be determined at a pressure of 0.210 kgf/cm².

## Table 2 Requirements for Rubber Rim Tapes

( *Clause* 5 )

| Sl No. | Characteristic | Requirement | Method of Test, Ref to |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Thickness, mm, *Min* | 0.8 | 3.4 of IS 2415 |
| ii) | Tensile strength, kgf/cm$^2$, *Min* | 70 | C-4.2.1 |
| iii) | Elongation at break, percent, *Min* | 300 | C-4.2.2 |
| iv) | Tension set ( 300 stretching ), percent, *Max* | 20 | C-5.4 |

## Table 3 Requirements for Plastic Rim Tapes

( *Clause* 6 )

| Sl No. | Characteristic | Requirement | Method of Test, Ref to |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Thickness, mm, *Min* | 0.3 | 3.4 of IS 2415 |
| ii) | Tensile strength, kgf/cm$^2$, *Min* | 30 | C-4.2.1 |
| iii) | Elongation at break, percent, *Min* | 75 | C-4.2.2 |

## Table 4 Length Requirements in Rubber and Plastic Tapes for Different Sizes of Rims

( *Clause* 7.1 )

All dimensions in millimetres.

| Bead Seat Diameter | New Marking | Old Marking | Length of Rubber Tape ±5 | Length of Plastic Tape ±5 |
|---|---|---|---|---|
| 642 | 37-642 | 28 × 1.3/8 | 1 981 | 1 799 |
| 635 | 47-635 | 28 × 1.1/2 × 1.3/4 | 1 960 | 1 780 |
| | 40-635 | 28 × 1.1/2 | | |
| 630 | 32-630 | 27 × 1.1/4 | 1 943 | 1 765 |
| 622 | 47-622 | 28 × 1.75 | 1 919 | 1 743 |
| | 37-622 | 28 × 1.5/8 × 1.3/8 | | |
| | 32-622 | 28 × 1.5/8 × 1.1/4 | | |
| | 28-622 | 28 × 1.5/8 × 1.1/8 | | |
| 590 | 37-590 | 26 × 1.3/8 | 1 820 | 1 653 |
| | 40-590 | 26 × 1.3/8 × 1.1/2 | | |
| 584 | 40-584 | 26 × 1.1/2 | 1 802 | 1 637 |
| | 50-584 | 26 × 1.1/2 × 2 | | |
| | 44-584 | 26 × 1.5/8 | | |
| | 44-584 | 26 × 1.1/2 × 1.5/8 | | |
| | 44-584 | 26 × 1.3/4 × 1.1/2 | | |
| 571 | 57-571 | 26 × 2 × 1.3/4 | 1 762 | 1 600 |
| | 50-571 | 26 × 2 | | |
| 559 | 40-559 | 26 × 1.50 | 1 725 | 1 566 |
| | 47-559 | 26 × 1.75 | | |
| | 50-559 | 26 × 1.90 | | |
| | 52-559 | 26 × 1.95 | | |
| | 54-559 | 26 × 2.00 | | |
| | 54-559 | 26 × 2.10 | | |
| | 57-559 | 26 × 2.125 | | |
| | 72-559 | 26 × 2.70 | | |
| | 80-559 | 26 × 3.00 | | |
| 540 | 37-540 | 24 × 1.3/8 | 1 666 | 1 513 |
| 534 | 45-534 | 24 × 1.1/2 | 1 647 | 1 497 |
| 507 | 52-507 | 24 × 1.95 | 1 564 | 1 421 |
| | 47-507 | 24 × 1.75 | | |
| | 57-507 | 24 × 2.125 | | |
| 451 | 37-451 | 20 × 1.3/8 | 1 391 | 1 264 |
| 406 | 47-406 | 20 × 1.75 | 1 252 | 1 137 |
| | 50-406 | 20 × 1.90 | | |
| | 52-406 | 20 × 1.95 | | |
| | 57-406 | 20 × 2.125 | | |
| 400 | 37-400 | 18 × 1.3/8 | 1 234 | 1 121 |
| 355 | 47-355 | 18 × 1.75 | 1 095 | 995 |
| | 52-355 | 18 × 1.95 | | |
| | 57-355 | 18 × 2.125 | | |
| 349 | 37-349 | 16 × 1.3/8 | 1 077 | 978 |
| 305 | 47-305 | 16 × 1.75 | 941 | 855 |
| | 52-305 | 16 × 1.95 | | |
| | 57-305 | 16 × 2.125 | | |
| 288 | 44-288 | 14 × 1.3/8 × 1.5/8 | 888 | 807 |
| 254 | 47-254 | 14 × 1.75 | 784 | 712 |
| | 52-254 | 14 × 1.95 | | |
| | 57-254 | 14 × 2.125 | | |
| 203 | 47-203 | 12.1/2 × 1.75 × 2.1/4 | 626 | 569 |
| | 62-203 | 12.1/2 × 2.1/4 | | |

**Table 5 Width Requirements in Rubber and Plastic Tapes for Different Sizes of Rims**

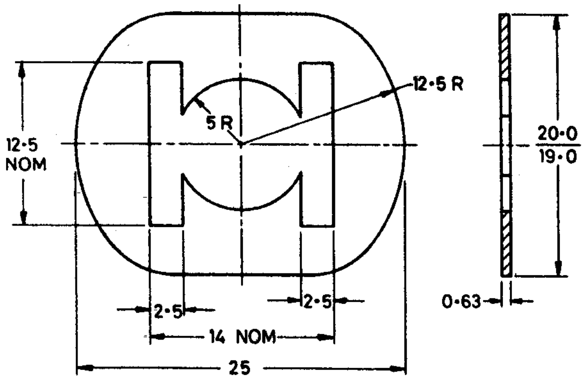
( *Clause* 8.1 )

All dimensions in millimetres.

| Size | Width of Rubber Tape ±1 | Width of Plastic Tape ±1 |
|---|---|---|
| (1) | (2) | (3) |
| For all sizes | 15, 20 | 13, 19 |

## 9 BUCKLES

**9.1** The shape and dimensions of buckles shall be as given in Fig. 1. They shall be tinned, galvanized, cadmium-plated, painted, or chemically coloured to protect them from rust. The buckles shall be zinc plated to Service Condition No.2 ( Classification No. Fe Zn 12.5 ) of IS 1573 or tin plated to Service Grade No. 2 Sn 8 of IS 1359 or nickel plus chrome plated to Service Condition No.1 ( Classification Code Fe/Ni 10 b Cr r ) of IS 1068.



All dimensions in millimetres.

FIG. 1 DIMENSIONS FOR BUCKLES FOR BICYCLE RIM TAPES

## 10 SAMPLING

Unless otherwise agreed to between the manufacturer and the purchaser the procedure given in IS 2500 ( Part 1 ) shall be followed. The single sampling plan to be followed for each characteristic shall be corresponding to the inspection level and AQL as given in Table 6.

**Table 6 Sampling Plan for Rim Tapes and Buckles**

| Sl No. | Characteristic | Inspection Level | AQL Percent |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Rim tape weave, width, ends, picks and thickness | S-4 | 4.0 |
| ii) | Weight, braking strength and elongation | S-1 | 1.5 |
| iii) | Buckles | S-4 | 2.5 |

## 11 PACKING

**11.1** The tapes shall be made into rolls of 100 m lengths and shall be individually wrapped in craft paper and a number of such rolls may be packed in wooden packing case. The number of rolls to be packed in a case shall be as agreed upon between the supplier and the purchaser.

**11.2** The buckles shall be packed in accordance with the best prevalent trade practice.

## 12 MARKING

The tapes and the buckles shall bear the manufacturer's name, initials or trade-mark.

### 12.1 BIS Certification Marking

The tapes and buckles may also be marked with the Standard Mark.

**12.1.1** The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to the manufacturers or producers may be obtained from the Bureau of Indian Standards..

# ANNEX A

( *Clauses* 7.2 *and* 8.2 and *Table* 1 )

## METHOD FOR DETERMINATION OF LENGTH AND WIDTH OF THE TAPES

### A-1 TEST PIECE

Unroll a test specimen and lay a portion of it on a horizontal surface and smooth it out with no greater tension than is necessary to make it lie straight and flat.

### A-2 LENGTH

Measure to an accuracy of 1 mm, length of the tape by means of a graduated steel measuring tape placed at right angles to the width of the tape. Determine similarly the length of the tape at different places uniformly distributed along the width of the tape. Calculate the mean of the 3 test values.

### A-3 WIDTH

Measure the width of the tape to an accuracy of 1 mm. Determine similarly the width of the tape at different places uniformly distributed along the length of the tape. Calculate the mean of the 5 test values.

# ANNEX B

( *Table* 1 )

## METHOD FOR DETERMINATION OF WEIGHT FOR COTTON TAPES

### B-1 TEST SPECIMENS

Cut a piece of tape approximately 1 m in length from each of the tapes constituting the sample under test.

### B-2 CONDITIONING OF TEST SPECIMENS

Prior to test, the test specimens shall be conditioned in a standard atmosphere at 65 ± 2 percent relative humidity and 27 ± 2° C temperature ( *see* IS 196 ) for 48 h.

### B-3 PROCEDURE

**B-3.1** Take a test specimen and apply a tension equal to one percent of the minimum breaking load of the tape. After 60 ± 5 s, place two marks on the tape at a distance of 1 m apart.

NOTE — The tension may be applied in a breaking load testing machine; it may also be applied by fixing one end of the tape to a peg and passing the tape around a pulley and hanging the desired load at the other end.

**B-3.2** Release the load and cut the test specimen at the marks, and determine its weight to the nearest gram.

**B-3.3** Calculate the weight of the tape per 100 m by the following formula:

$$W = W_1 \times 100$$

where

$W$ = weight of 100 m of the tape, in g; and

$W_1$ = weight of 1 m length of the tape, in g ( *see* **B-3.2** ).

**B-3.4** Repeat the test with the remaining test specimens ( *see* **B-1.1** ).

# ANNEX C

( *Tables* 2 *and* 3 )

## METHOD FOR DETERMINATION OF TENSILE STRENGTH, ELONGATION AT BREAK AND TENSION SET FOR PLASTIC AND RUBBER TAPES

### C-1 TEST SPECIMENS

Cut a piece of tape approximately 250 mm in length from each of the tapes constituting the sample under test. Make the bench marks of 25 mm on the test pieces.

### C-2 TIME LAPSE BETWEEN MANUFACTURE AND TESTING

For all test purposes the minimum time between manufacture and testing shall be 16 h, in order to ensure that the material attains dimensional stability due to stress relaxation.

### C-3 CONDITIONING

Prepared test piece shall be conditioned immediately before testing for a minimum period of 3 h at 27 ± 2°C, the same temperature being used through out the test.

### C-4 TENSILE STRENGTH AND ELONGATION AT BREAK

**C-4.1 Procedure**

Insert the test piece into the grips of the tensile testing machine, taking care to adjust it symmetrically so that the tension will be distributed uniformly over the cross-section. Then start the machine and measure the distance between the centres of the bench marks as required to the nearest 1 mm taking care to avoid parallax, until the test piece breaks, if necessary. Note the load on the test piece, as required.

**C-4.2 Calculations**

C-4.2.1 *Tensile Strength*

The tensile strength is given, in kgf/cm$^2$, by the formula:

$$\text{Tensile strength} = F/A$$

where

$F$ = breaking load, in kgf; and

$A$ = initial cross-sectional area, in cm$^2$.

C-4.2.2 *Elongation at Break*

The percentage elongation at break is given by the formula:

$$\text{Elongation at break} = \frac{L - L_0}{L_0} \times 100$$

where

$L_0$ = initial length between bench marks, in mm; and

$L$ = length between bench marks at break, in mm.

### C-5 TENSION SET

**C-5.1 Definition**

Proportion of applied strain remaining after a test piece has been stretched and allowed to retract in a specified manner.

**C-5.2 Outline of the Method**

Test piece of standard dimension is stretched to a specified length in a suitable apparatus, for specified time and temperature and then allowed to recover. Then tension set is calculated as the percentage of the initial strain.

**C-5.3 Procedure**

Mark the unstrained reference length as 25 mm at 27 ± 2°C. Place the ends of test piece into the clamps of the straining device. Extend the test piece to the 300 percent strained at a speed between 450 ± 50 mm/min. Between 10 and 20 min after the specified strained has been reached, measure the strained reference length to the nearest 0.1 mm. Release the strain at a speed of 450 ± 50 mm/min, remove the test piece from the clamps and lay free on a wooden surface. After $30^{+3}_{-0}$ min measure the reference length to the nearest 1.0 mm.

**C-5.4 Calculation**

Calculate the tension set as the percentage of initial strain:

$$\text{Tension set} = \frac{L_1 - L_0}{L_s - L_0} \times 300$$

where

$L_1$ = reference length after recovery;

$L_0$ = unstrained reference length; and

$L_s$ = strained reference length.

The mean of the results for the 3 test pieces shall be reported.

# ANNEX D

( *Foreword* )

## COMMITTEE COMPOSITION

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**Amendments Issued Since Publication**

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**Headquarters:**

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*Telephones* : 2323 0131, 2323 3375, 2323 9402 *Website* : www.bis.org.in

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